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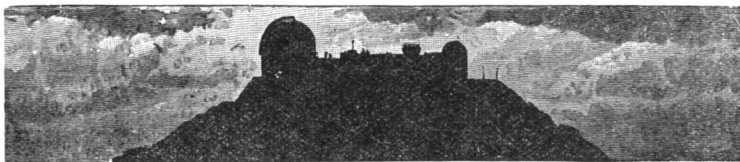
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NOTES FROM PACIFIC COAST OBSERVATORIES.

RECENT PROGRESS IN THE WORK OF THE D. O. MILLS EXPEDITION TO THE SOUTHERN HEMISPHERE.

During the past three years the work on the radial velocity survey of southern stars at the Observatory of the D. O. Mills Expedition has continued to proceed very favorably. At present the total number of plates taken at this station is about two thousand seven hundred. In 1908 Santiago was favored with an exceedingly fine and open winter season, so that it was possible to secure a much better representation than usual for this part of the program; there were about two hundred nights entirely clear in the year May, 1907, to May, 1908, with about sixty other nights of which at least half was available for work. Advices recently received from Santiago indicate that the past winter season has likewise been a very favorable one.

During the past two years most of the work has been done with the two-prism instrument; the limit of this spectrograph, without unduly prolonging exposures, is about photographic magnitude 7.0. At present, however, the program is simply to finish the work on all stars of visual magnitude 5.0 or brighter, leaving the considerable number of available early and solar type stars fainter than the fifth visual magnitude for later investigation.

While the method of refrigeration employed for cooling the mirror and obviating focal changes in the optical system was efficient for the purpose (cf. *Lick Observatory Bulletin*, No. 122), this is no longer used. The seeing for the first two hours after sunset at Santiago is rarely good enough to warrant attempting to gain what slight advantages there are, from the standpoint of spectroscopic work, in having the focus remain constant during this period, though for other classes of work some such method of focal control might be essential. Certain

changes have been made by which it is now possible at all times to test the position of the focus and make the needed changes in the position of the spectrograph in a few seconds. This is made possible by connecting the screws which run the spectrograph up and down by means of bevel gears to a handle close to the observer. Occasionally, in the more unsettled weather conditions of the spring season, the focal length of the optical system will change by an amount too great to be allowed for by the existing amount of travel accorded to the spectrograph, which at present is a little over one inch. For such cases an attachment has been fitted by means of which the observer at the eye end can easily and quickly run the secondary mirror in or out a small distance to compensate for the abnormal change of focus. In the design of future spectrographs for use with large reflecting systems care should be taken to allow for ample travel for the spectrograph in the optical axis, though this attachment for moving the position of the secondary mirror of the Mills Reflector at Santiago works very easily and smoothly. A few other minor improvements have been made in the interests of easier observing; the comparison apparatus has been entirely re-made of steel, with provision for greater ease in adjustment than was allowed for in the former design.

The work of the radial velocity survey has occupied almost the entire time of the two observers, but a number of investigations have been made, or are in progress, along lines more or less allied to the main purpose of the expedition.

Forty-eight spectroscopic binaries have been announced to May, 1909, by Professor W. H. WRIGHT, Dr. H. K. PALMER, Dr. S. ALBRECHT, the writer, and Mr. GEORGE F. PADDOCK. Orbits have been computed by the writer for three of these—*α Carinæ*, *κ Velorum*, and *α Pavonis*. The binary character of perhaps fifteen more stars is suspected, but awaits the confirmation of further plates before being announced.

A number of stars having proper motions of 1".0 of arc or greater per year have been investigated, mainly with the one-prism instrument; during the course of this work three stars with radial velocities of unusual magnitude have been found:—

Cordoba Zones, 5 ^h 243	+ 242 ^{km}	per second
Lacaille 2957	+ 100	" "
Lacaille 8362	— 132	" "

Especial interest attaches to the first star on the list, whose proper motion of $8''.7$ of arc per year is the greatest hitherto observed. It is believed that the radial velocities of C. Z. 5^h 243 and Lacaille 8362 are the largest observed up to date. KAPTEYN has pointed out that, of stars with considerable proper motion, there is a considerable preponderance of the later stellar types. A number of these stars have not hitherto been observed spectroscopically, and it is of interest to note that thus far in the investigation no case has occurred of a spectrum of the hydrogen or helium type.

During February and March, 1909, considerable time was devoted to securing an extended series of spectrographic and photographic observations of Comet MOREHOUSE.

The one-prism instrument has been employed by Mr. PADDOCK to secure data for the study of several southern variable stars.

Dr. J. H. MOORE arrived in Santiago to take charge of the station on June 5, 1909, and the writer left for California on June 17th, after three and a half years spent in Santiago. It is a pleasure to be able to express here my appreciation of the uniform courtesy and interest manifested by the Government of Chile and by the people of Santiago in the work of the D. O. Mills Expedition. A list of those who have at one time or another thus shown their interest in the expedition is here unnecessary, for I found no department of the government or the municipality of Santiago that was not ready at all times to render any possible assistance. Santiago is a cosmopolitan city of nearly four hundred thousand inhabitants, including about five thousand French, perhaps ten thousand Germans, and a growing colony of about eight hundred English and Americans; there is probably no city south of the equator more pleasant as a place of residence as regards both climatic conditions and social advantages.

HEBER D. CURTIS,

In charge of D. O. Mills Expedition, 1906-09.

ON THE SPECTRUM OF *MARS*.

When the spectrum of *Mars* was under observation extensively at Mount Hamilton in 1894, for the purpose of detecting the presence of water vapor in that planet's atmosphere, I